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APPLICATION NUMBER: *60/311,024*
FILING DATE: *August 08, 2001*
RELATED PCT APPLICATION NUMBER: *PCT/US02/25217*

By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

N. WOODSON
Certifying Officer

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08-10-01

Approved

Practitioner's Docket No. 750.01-PRO

PATENT

Preliminary Classification
Proposed Class:
Subclass:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Long, David M.

For: Thermal Destruction of Cyanide Wastes as a NOx Control Mechanism

Box Provisional Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

COVER SHEET FOR FILING PROVISIONAL APPLICATION
(37 C.F.R. SECTION 1.51(c)(1))

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 C.F.R. section 1.51(c)(1)(i). The following comprises the information required by 37 C.F.R. Section 1.51(c)(1):

1. The name of the inventor is (37 C.F.R. Section 1.51(c)(1)(ii)):

CERTIFICATION UNDER 37 C.F.R. SECTION 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on August 8, 2001 (date), in an envelope as "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C.F.R. Section 1.10, Mailing Label Number EL751089709US addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Sara L Geer

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. Section 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

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"Since the filing of correspondence under [Section] 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

1. David M. Long

2. Residence address of the inventor, as numbered above (37 C.F.R. Section 1.51(c)(1)(iii)):

1. 1812 Conejo Lane
Fullerton, CA 92833
USA

3. The title of the invention is (37 C.F.R. Section 1.51(c)(1)(iv)):

Thermal Destruction of Cyanide Wastes as a NOx Control Mechanism

4. The name, registration, customer and telephone numbers of the practitioner are (37 C.F.R. Section 1.51(c)(1)(v)):

Name of practitioner: Robert D. Fish
Reg. No. 33,880
Tel. No. 714-449-2337
Customer No. 24392

5. The docket number used to identify this application is (37 C.F.R. Section 1.51(c)(1)(vi)):

Docket No. 750.01-PRO

6. The correspondence address for this application is (37 C.F.R. Section 1.51(c)(1)(vii)):

Robert D. Fish
1440 N. Harbor Blvd.
Suite 706
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7. Statement as to whether invention was made by an agency of the U.S. Government or under contract with an agency of the U.S. Government. (37 C.F.R. Section 1.51(c)(1)(viii)).

This invention was NOT made by an agency of the United States Government, or under contract with an agency of the United States Government.

8. Identification of documents accompanying this cover sheet:

A. Documents required by 37 C.F.R. Section 1.51(c)(2)-(3):

Specification:	No. of pages	3
Drawings:	No. of sheets	0

B. Additional documents:

9. Fee

The filing fee for this provisional application, as set in 37 C.F.R. Section 1.16(k), is $75.00 for a small entity.

Applicant is a small entity.

10. Small entity statement

The statement that this is a filing by a small entity under 37 C.F.R. Sections 1.9 and 1.27 is claimed.

11. Fee payment

Fee payment in the amount of $75.00 is being made at this time.

12. Method of fee payment

Check in the amount of $75.00.

Please charge Account No. 500341 for any fee deficiency.

Date: 8/8/01

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DISCLOSURE

Title

Thermal Destruction of Cyanide Wastes as a NOx Control Mechanism

Description

It is contemplated that cyanide containing wastes such as from mineral extraction and potliners used in aluminum smelting may be subjected to thermal treatment in order to thermally decompose their cyanide (HCN) component of the wastes into carbon dioxide (CO_2) and ammonia (NH_3), and to utilize the resultant ammonia as part of a NOx reduction process such as selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR).

NOx is generated by many combustion processes (such as fuel combustion in cement kilns). NOx has been implicated in a number of environmental effects both in the direct emission of NOx into the atmosphere and as a precursor to the formation of ozone (NOx combines with other pollutants in the atmosphere to create O_3, a substance known as ground level ozone) and acid rain. As such, NOx is an undesirable byproduct of fuel combustion.

A method for removing nitrogen oxides derived from combustion is to convert them to inert nitrogen gas and water vapor by reduction with amine type reductant materials (by SCR and SNCR processes). Ammonia is a reductant material that has achieved commercial acceptance for use in such processes.

Cyanide is sometimes used for extraction of metals from ores. Cyanide leaching widely used in gold and silver mining operations. During the leaching operation the ore becomes infiltrated with cyanide and chemically related compounds. Once the metals are removed from the ore, the residuals still contain significant concentrations of cyanide, limiting the placement and utilization of the residuals must be managed as a hazardous waste.

In the manufacture of aluminum, a "pot" comprising a steel shell lined with insulation material and a layer of carbon (the insulation material and carbon layer making up a "potliner") is

used wherein the layer of carbon acts as the cathode for the electrolysis process which reduces alumina to aluminum. This liner degrades during the production process, and the resultant waste is an EPA listed (K088) hazardous waste. This waste typically contains cyanides, fluorides and heavy metals.

Ammonia for use as a reductant in an SCN or SNCR process can be obtained by thermally treating the potliner waste to cause thermal cyanide destruction and thus decompose the cyanide into ammonia and carbon dioxide.

As such, a contemplated method for reduction in NOx production may involve any combination of one or more of the following steps: (1) Identifying a process which produces undesirable amounts of NOx; (2) Recognizing that at least some of the NOx produced can be removed through the use of a reductant obtained from a cyanide containing waste; (3) Identifying a cyanide containing waste containing such a reductant; (4) Thermally processing the cyanide containing waste to obtain the reductant in a form suitable for use in a NOx reduction process; and (5) Using the reductant obtained from the cyanide containing waste in a NOx reduction process.

Although reductants obtained from cyanide containing wastes may be used to decrease the amount of NOx produced from almost any NOx producing process including but not necessarily limited to cement manufacturing.

As disclosed herein cyanide containing wastes, including but not necessarily limited to wastes resulting from mining operations and potliner waste resulting from aluminum production, may be particularly beneficial as a reductant source. However, other waste materials may be suitable for use as a reductant source. It is contemplated that the use of non-cyanide containing wastes may require the use of alternate reductants contained in such wastes.

It is contemplated that heat treatment of reductant containing wastes may be desirable to separate the reductant from the wastes. However, any suitable process by which the reductant can be obtained from the wastes in a form suitable for use in a NOx reduction process may be used.

A preferred reductant is ammonia, but it is contemplated that the wastes may provide reductants other than ammonia.